

ROUTING AND DESIGN IN K-SHARED NETWORKS**Abstract**

Techniques for network routing and design are provided. A technique for determining a route for a demand in a network, wherein the network comprises primary paths and secondary paths, and at least two secondary paths may share a given link, comprises the following steps/operations. First, a graph representing the network is transformed. Edges of the graph represent channels associated with paths and nodes of the graph represent nodes of the network. The transformation is performed such that costs associated with the edges reflect costs of using channels in secondary paths. Then, the shortest path between nodes corresponding to the demand is found in the transformed graph. The shortest path represents the least-cost path in the network over which the demand may be routed. When the above route determination steps/operations result in a path with at least one loop, an alternative routing process may be executed so as to determine a loopless path for the demand. Further, integer linear program formulation design techniques are provided.